Advanced translation research steps and tools used in ESP teaching

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Abstract

This presentation is an intellectual and a mental exercise of an ESP teacher in various departments at a non-English (i.e. Greek) University, who has encountered two different but very problematic case studies in her ESP teaching:

- How can waves of translation and the polysemous terminological entity bed be rendered in Greek?
- Where can their possible equivalences be found and how can one be sure for their appropriate use?

To answer these questions, the author explores how the advanced search for translators methodology and the concept of inter-scientificity can help ESP teachers acquire a better knowledge of the domain-related discourse(s) they may teach in English.

Finally, considering the complexity of teaching ESP/EAP at non-English universities, the writer wishes to see ESP teachers cooperate with a variety of specialists (i.e. specialists in scientific domains, translation scholars, lexicographers) to take further their teaching.

Keywords: advanced translation research steps and tools, untranslatability, equivalence, interdisciplinarity, inter-scientific competence, inter-scientificity

1. Introduction: Academic context and challenges

Undergraduate students in a variety of scientific domains and Departments (i.e. Geography, Marine Sciences, Environmental Sciences, Anthropology and History, Cultural Technology and Communication, Sociology) at Greek Universities usually have to search for and read a substantial number of reference material written in English and use the information and knowledge acquired through extensive reading in oral presentations and written essays in parallel courses whose language of instruction is Modern Greek. Thus, the respective Departments in Greece (the local contexts)[1] usually provide ESP courses (the global context) where students tackle specific tasks that involve using specialised texts written in English (the global language) and transferring the information and knowledge acquired to Greek (the local language).

Should the aforementioned academic environments be taken into consideration, how can an ESP course in diverse Departments - such as: Geography, Social

[1] All the aforementioned Departments are at the University of the Aegean on the island of Lesvos.

Anthropology and History, Cultural Technology and Communication, Sociology and Marine Sciences – help students move with ease between at least two different linguistic, scientific, professional and cultural contexts? More specifically, how can an ESP course help Greek undergraduate university students learn to move with ease between global (communicated in English) and local (communicated in Greek) knowledge-based environments? How can both ESP teachers and students: (1) render in Greek terms such as waves of translation (Pinet 2006: 252, 253) and the polysemous terminological entity such as bed, and (2) be sure that the possible Greek equivalences they have found are the most appropriate ones?

2. Research methodologies to face terminological challenges

Trying to understand her own field of studies and practice, the author will venture to show how complex and even frustrating at times ESP teaching can become, especially when involving highly specialised texts which are out of the ESP teacher's specialisation. In order to do that, the writer will try to answer some core questions when encountering highly specialised (scientific or domain-specific) texts such as: "What kind of equivalence (if any) should there be in scientific texts?" "What can an ESP teacher do when s/he encounters scientific terms going beyond his/her field of studies?" Trying to answer the aforementioned questions, the writer will first present two different but very problematic case studies, where in the first case no renderings or equivalences in Greek can be found in any specialised bilingual or multilingual glossary (i.e. IATE), thus advanced search for translators should be followed, whereas in the second case, there are at least two (2) renderings or equivalences in Greek, but the issue is which of them is the most appropriate for the specific (con)text. Then, the author will describe in detail the (logical) steps she has followed to encounter these terminological challenges so that other ESP teachers would benefit from her experience.

2.1 Case study 1: Methodology of Advanced Search for Translators

As ESP teachers, we are used to the various meanings translation assumes within the context of Translation Studies; that is, the transposition of a word/phrase or a text into a different language and culture. What happens, however, when we encounter translation in highly specialised text of oceanography within the context of waves of translation (Pinet 2006: 252, 253), and we want to discuss about it in our mother

tongue (Greek in our case)? What should an ESP teacher do especially when specialists in the specific field express ignorance of any equivalences of translation in their domain specific field in the language of instruction (e.g. Greek)?

In the following sub-sections, the writer will present a scaffolding of advanced translation steps she took to overcome the problem of untranslatability she was facing. Within the present context, it is enough to say that the advanced translation steps described below took the writer almost a month to conceptualise and execute, since she had help from no specialist when she wanted to doublecheck some terms in Greek. In other words, specialists themselves did not know how to render "*waves of translation"* in Greek, thus raising the issue of untranslatability.

In Translation Studies (Bassnett 2002), untranslatability is considered the property of any utterance, phrase or a text in one language [SL: Source Language] (in our case the English term: waves of translation) for which there is no equivalence or no equivalent utterance, phrase or a text in another language [TL: Target Language] (in our case, no Greek equivalent term of the English term: waves of translation has yet to be found). When a term is usually untranslatable, there is a lexical gap (or lacuna) in the TL; that is, there is no 1:1 equivalence between the term in the SL and that in the TL. However, terms or phrases are not exclusively untranslatable; it is rather their nature that makes them difficult to translate, and the translator's skills and knowledge of both SL and TL to overcome untranslatability. If the untranslatability issue persists in a text, then the translator resorts to a number of translation procedures to compensate, namely a translator's note where s/he explains his/her way of overcoming untranslatability issues.

Step 1 --- Search in technical e-dictionaries and printed dictionaries

Searching in IATE (InterActive Terminology for Europe) - the EU's term base, we found a lot specialised Greek meanings or lexemes of translation but there was not such a term as wave of translation! As far as translation is concerned, there are the following meanings in English (SL) and different terms in Greek (TL), as presented in Table 1:

ENGLISH (SL)	**GREEK** (TL)
LINGUISTICS & TRANSLATION STUDIES	
Translation	Μετάφραση Μεταφορά (metaphorical meaning)
ENGINEERING	
Translation	(1) Μετατόπιση (: transposition, shifting, moving, displacement) (2) Μεταφορά (literal meaning [lit.]) (3) Κάθοδος (: descent) (4) Μετατροπή (: conversion, transformation, switch, attention, modification)
translation speed	(1) ταχύτητα μετατόπισης
ELECTRONICS	
translation frequency (: conversion frequency)	(4) συχνότητα μετατροπής
STATISTICS	
Johnson's system or method of translation	σύστημα του Johnson

Table 1: Different linguistic and domain-specific meanings of translation

The above different linguistic and domain-specific meanings of translation led us to the following set of questions: Is there any possibility that translation may have more meanings or lexemes? If yes, what are these and how can they be found?

Step 2 --- Search in Physical Sciences and in other monolingual and bilingual dictionaries

Trying to answer the aforementioned questions, we started to search for waves of translation in other English electronic and printed monolingual scientific dictionaries. We found nothing. So, we decided to search for translation and find what translation may signify in Physical Sciences, like Physics and Mathematics. We found the following:

1. In Biochemistry, translation is the process in the ribosomes of a cell by which a strand of messenger RNA directs the assembly of a sequence of amino acids to make a protein. http://www.thefreedictionary.com/translation[2]

[2] Cited from Collins English Dictionary – Complete and Unabridged © HarperCollins Publishers 1991, 1994, 1998, 2000, 2003.

2. In Biology, translation is the process by which messenger RNA directs the amino acid sequence of a growing polypeptide during protein synthesis. http://www.thefreedictionary.com/translation[3]
3. In Mathematics, translation is a transformation in which the origin of a coordinate system is moved to another position so that each axis retains the same direction or, equivalently, a figure or curve is moved so that it retains the same orientation to the axes http://www.thefreedictionary.com/translation[4]
4. In Countable, mathematics, and physics, translation is the motion in which all particles of a body move with the same velocity along parallel paths. http://www.thefreedictionary.com/translation[5]
5. In Physics, translation is the motion of a body in which every point of the body moves parallel to and the same distance as every other point of the body. http://www.thefreedictionary.com/translation[6]
6. Translation [ΜΗΧΑΝΟΛ.] Μετατόπιση. Η γραμμική κίνηση ενός σημείου στο χώρο χωρίς περιστροφή, (*McGraw-Hill Αγγλοελληνικό Λεξικό Μηχανικών,* 2000: 911).

From the above definitions in English and in Greek we can start speculating that 3, 4, 5 and 6 may be closer to waves of translation, since waves are sea bodies in motion. Thus, we decided to further our research into the definition of this term onto the Internet.

Steps 3 and 4 discussed below may seem simple, but they actually demand high analytical, comparative and contrastive as well as synthetic skills. Most students and specialists did google to find the Greek equivalent term to waves of translation but they found nothing and got really frustrated. It was at that point we were asked for help. We intervened by continuing searching, and we were able to come up with the equivalent Greek terms to waves of translation which are discussed below and shown in the comparative Table 2. It was our past training in Translation Studies that came to our help, as we explain analytically in Nikolarea (2006b).

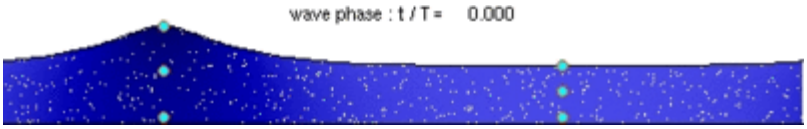
[3] Cited from Collins English Dictionary – Complete and Unabridged © HarperCollins Publishers 1991, 1994, 1998, 2000, 2003.
[4] Cited from Collins English Dictionary – Complete and Unabridged © HarperCollins Publishers 1991, 1994, 1998, 2000, 2003.
[5] Cited from Random House Kernerman Webster's College Dictionary, © 2010 K Dictionaries Ltd. Copyright 2005, 1997, 1991 by Random House, Inc.
[6] Cited from American Heritage® Dictionary of the English Language, Fifth Edition. Copyright © 2011 by Houghton Mifflin Harcourt Publishing Company. Published by Houghton Mifflin Harcourt Publishing Company.

Step 3 --- Search for a definition in English and in Greek onto the Internet

When we entered waves of translation in Google, we came across the following entries and diagrams.

(1) Considering what Erdman et al. (2008) claim we should do when we want to extract bilingual terminology from Wikipedia, we read in this engine machine:

"Waves and shallow water

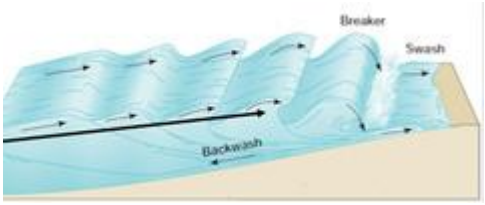


"When 'waves' travel into areas of shallow water, they begin to be affected by the 'ocean' bottom. The free 'orbital motion' of the water is disrupted, and water particles in orbital motion no longer return to their original position. As the water becomes shallower, the swell becomes higher and steeper, ultimately assuming the familiar sharp-crested wave shape. After the wave breaks, it becomes a wave of translation and erosion of the ocean bottom intensifies"; quoted from https://en.wikipedia.org/wiki/Waves_and_shallow_water

Despite the fact that Wikipedia is not considered a reliable source for searching in general and for terminological search in particular, in the above quotation we encountered the term waves of translation for the first time, something that helped us come to understand the complexity of the term in English.

(2) Whereas in another site, we read:

"Wave of Translation"



"Waves of oscillation change energy and mass moves in the same direction (horizontally)

1) As waves roll into shallow water, wave motion is affected by frictional drag on sea bottom

2) Waves are slowed and bunched together; wavelength decreases & wave height increases"; quoted from http://quizlet.com/6137949/physical-geography-1-chap-20-flash-cards/

Although the aforementioned entries and diagrams (1) and (2) provided us with definitions of waves of translation in English, we had yet to find an equivalent in Greek. Any search for 1:1 equivalence between English and Greek had failed. Then, we were forced to think in terms of synonyms of this term (i.e. waves of translation) first in English and then in Greek.

Step 4 --- Search for synonyms in English and possibly in Greek

Searching more carefully and thoroughly onto the Internet, we were stunned to find two alternative terms and ideal synonyms of the wave of translation in English. We found that a wave of translation is called Russell's solitary wave or soliton, as quoted from http://en.wikipedia.org/wiki/Soliton.

Once again, although Wikipedia is not considered a reliable source for terminological search, in the present context we realised that a wave of translation and a Russell's solitary wave or a soliton are ideal synonyms and interchangeable terms, with an amazing linguistic and cultural difference within a wider English scientific environment. Whereas a wave of translation is regularly used primarily by American scientists (Pinet is an American scientist and writer and addresses a wider North American (US and Canadian) readership), a Russell's solitary wave or a soliton are used by European scientists and authors. Thus, we came to realise the presence of a linguistic and cultural difference in the scientific use of a term within a wider English-speaking scientific community. Thus, within a wider English scientific community, the term wave of translation can be familiar to the scientists in the USA and Canada or totally unknown to the scientists in the UK and in Europe.

While having the aforementioned synonyms and their use in mind, we started searching whether we could find any equivalence in Greek; and we found what is shown in Table 2, below:

ENGLISH	**GREEK**
Waves of translation	Κύματα μεταφοράς (lit. waves of transposition or transference)
or	
(Russell's) solitary wave (in singular) Or Soliton	Μεμονωμένα κύματα (in plural) http://www.surfresearch.com.au/awaveheight.html or Μοναχικά κύματα (in plural) ▪ κύματα μεταφοράς, μοναχικά κύματα, κύματα ρηχών νερών, σολιτόνια (in plural) at http://ikee.lib.auth.gr/record/131727/files/GRI-2013-10404.pdf

Table 2: Equivalences of Waves of Translation

Should we observe carefully the above Table, we see κύματα μεταφοράς (lit. waves of transposition or transference) being the equivalence of waves of translation, whereas Russell's solitary wave has two equivalences: Μεμονωμένα κύματα and/ or Μοναχικά κύματα, which literally can be rendered solitary waves, with the former being a more archaic form than the latter; the only difference is that the Greek equivalences are in plural form. The other alternative term Soliton is rendered as Σολιτόνια in Greek.

After a much closer reading of Table 2, we realise that Μοναχικά κύματα can be interchangeable with κύματα μεταφοράς (lit. waves of transposition or transference), μοναχικά κύματα (lit. solitary waves) and κύματα ρηχών νερών (lit. waves of shallow waters). This abundance in Greek equivalents of an English term denotes that there has not been any established term in Modern Greek either for waves of translation or for Russell's solitary waves. Thus, we had to decide which Greek equivalent to waves of translation could be the most appropriate.

After we had made another much closer reading of our material, gone through some cognitive and mental processes and, finally, made some linguistic associations, we decided to choose κύματα μεταφοράς as the Greek equivalent to waves of translation, because there is a striking linguistic similarity between the terms μεταφορά and translation. On the one hand, the Greek term μεταφορά means: transposition, transference and its Greek prefix μετα is also the prefix for the Greek word μετάφραση, which means: translation or lit. transposition or the movement of a word/phrase from one language (SL) and context to another language (TL) and

context. On the other hand, the English term translation also means: transposition, transference. Moreover, the Latin prefix for the English word translation, that is, trans means – as the Greek prefix μετα – the transposition or the transference of something (i.e. a word/term or anything else) to somewhere else (i.e. to a different linguistic, cultural context or place).

2.2 Case study 2: Polysemy of a term and its most appropriate equivalence

How can a polysemous terminological entity such as bed - which is encountered in a variety of highly specialised texts of (inter)related disciplines, such as physical geography, oceanography, environmental studies - be rendered in Greek?

Bed: (1) Πυθμένας. Ο πυθμένας ενός ποταμού ή καναλιού ή της θάλασσας. (ΓΕΩΓΡ, ΓΕΩΔ, ΘΑΛ, ΜΗΧΟΝ, ΠΕΡΙΒ, ΥΔΡΟΛ, ΩΚΕΑΝ). (2) Κοίτη ποταμού. Η επιφάνεια του νερού του ποταμού με το έδαφος. (ΓΕΩΓΡ, ΓΕΩΔ, ΘΑΛ, ΜΗΧΑΝ, ΠΕΡΙΒ, ΥΔΡΟΛ, ΩΚΕΑΝ)

Figure 1

Both in English and in Greek, bed can be used in the scientific environments with the same meaning and nuances; yet, in Greek two different lexical items (lexemes) are used to indicate the general and the scientific meaning; see Figure 1, (1) and (2) respectively. In other words, these lexemes are semantically different. Thus being polysemes.

More specifically, bed is a technical term with, at least, two different meanings as shown below:

(1) in Geography (ΓΕΩΓΡ), Geodesy (ΓΕΩΔ), Marine Sciences (ΘΑΛ), Engineering (ΜΗΧΟΝ), Environmental Sciences (ΠΕΡΙΒ), Hydrology (ΥΔΡΟΛ) and in Oceonagraphy (ΩΚΕΑΝ), it signifies: the bottom of a river or a canal or the sea, and

(2) in Geography (ΓΕΩΓΡ), Geodesy (ΓΕΩΔ), Marine Sciences (ΘΑΛ), Mechanical Engineering (ΜΗΧΑΝ), Environmental Sciences (ΠΕΡΙΒ), Hydrology (ΥΔΡΟΛ) and in Oceanography (ΩΚΕΑΝ), it signifies: The surface of the river water in the ground or the riverbed, as it is also referred to.

Now, whereas in English *one single word* or one lexeme (i.e. bed) denotes both technical meanings, in Greek *two different words* or two different lexemes or

polysemes are used: (1) Πυθμένας and (2) Κοίτη ποταμού for two of its technical meanings (see Figure 4, (1) and (2) respectively).

So, Greek undergraduate students of Geography, Geodesy, Marine Sciences, Mechanical Engineering, Engineering, Environmental Sciences, Hydrology and Oceanography should first know that when bed is used in different linguistic environments it may have two equivalents in Greek (see Figure 4, (1) and (2)), and second identify which meaning this term acquires in a given scientific environment; that is, if bed is used as the 'bottom of the sea' or seabed (Figure 4 (1)) or as 'the surface of the river water in the ground' or riverbed (Figure 4 (2). The ESP teachers and students' ability to identify which meaning bed acquires in a scientific (con)text and transfer it to their language of instruction (i.e. Greek) appropriately is an issue of inter-scientific competence or inter-scientificity.[7]

3. ESP teachers' awareness and development of inter-scientificity

As we claim in one of our early studies on inter-scientific competence (Nikolarea 2004a), inter-scientific competence or 'inter-scientificity' is the competence that ESP/EAP teachers, university students, scientists, and translators/interpreters alike acquire in the scientific language and discourse used in two different linguistic, socio-political and cultural context(s); it is their ability to move with ease between at least two different linguistically scientific contexts and comprehend inter-scientific differences not only across a variety of disciplines but also across different linguistic systems and cultures; see also Nikolarea 2004b, 2006a.

This indicates that ESP/EAP teachers**,** university students, scientists, and translators/interpreters alike should not decontextualise the scientific discourse from its respective linguistic, socio-political and cultural context(s), but, on the contrary, they can explore the interrelation of scientific language and discourse with other aspects of human life, at a time that interrelatedness among issues as well as interdisciplinary and multidisciplinary approaches to socio-political and environmental issues are of first priority for Social Scientists. Thus, inter-scientifically competent may be called the ESP/EAP teacher, the student, the scientist and translator/interpreter who can distinguish between various readings of

[7] At this point, we should emphasise that English university students may also have the same difficulty as their Greek counterparts with identifying which meaning bed acquires in a given scientific (con)text, thus encountering the same issue of inter-scientificity.

polysemous terminological entities such as waves of translation and bed.

As we discussed in another paper more thoroughly (Nikolarea 2006a), it is the interdisciplinarity of certain disciplines and sciences that give birth to inter-scientificity, since an interdisciplinary field usually draws upon different disciplines and thus its terms, when re-contextualised, usually assume a totally different meaning from their initial one[8]. It is this interface of interdisciplinarity and inter-scientificity that lends polysemy and a multi-levelled of understanding to domain-related terminology and scientific discourse and makes them difficult to be understood and sometimes actively used by translators/interpreters.

Therefore, ESP/EAP teachers should first become aware of and be trained in the polysemy of scientific terminology; they can then gradually reach such level of understanding of scientific discourse (both in English and in the language they are going to render it into) so that they can use it appropriately and accurately across disciplines, languages and cultures.

In order for ESP teachers to acquire and develop *'inter-scientific' competence*, the would-be ESP teachers should be trained in how to carry out research into:

(1) authentic materials written in English so as to develop very advanced analytical and combinatory skills;
(2) scientific bilingual terminology (Baker 1997; Sager 1990)[9], which demands:
    a. very advanced analytical skills;
    b. comparative and contrastive skills
    c. very advanced synthetic skills; and
    d. inter-scientific competence (Nikolarea 2004a & b, 2006a).

ESP teachers should therefore be trained by translation and terminology scholars and lexicographers in co-operation with specialists of different scientific domains.

Training in inter-scientificity or developing inter-scientific competence requires an interdisciplinary and multidisciplinary approach, which will equip ESP teachers with the necessary skills and understanding to:

- become explorers and learners of their new learning situation and environment;

[8] A similar claim is made by Reguzzoni (2006:13-16), who is an ESP teacher in Marine Studies in Italy.
[9] More recent literature in scientific bilingual terminology uses mathematical models which go beyond the scope of the present paper.

- be flexible in the use of authentic materials composed in English, since they will be able to assess what the specific classroom situation and profession demands;
- develop uncertainty and stress tolerance for unknown scientific domains and understand better their students' anxiety and risk of failure in making an effort to acquire and develop scientific discourse(s) in two different linguistic systems;
- be aware of their students' general and scientific knowledge and make it a motivation factor, so that the students are willing to explore the issues and risks involved in inter-scientificity.

4. Concluding Remarks

Considering the complexity of the inter-scientificity involved in ESP teaching at non-English Universities - where university students should learn how to move with ease between their reading of international literature written in English (global academic context) and their transferring the knowledge they acquire in their parallel classes taught in the local language (Greek in our case; thus, local academic context) – our present study (as some of the previous ones; that is, Nikolarea 2004a & b, 2006a & b) may present certain limitations lying in four psychological and cognitive interdependent factors, which we have observed through our 17-year ESP teaching experience (Nikolarea 2006b) and which are the following:

1. The ESP teacher's unawareness or ignorance of the presence of inter-scientificity, thus, s/he cannot recognise it when s/he encounters it in a text.
2. The ESP teacher's unwillingness to deal with the issue of inter-scientificity, when encountering it; thus, s/he does not want to risk losing face to his/her students by saying: 'I don't know, but I will do some search'.
3. The ESP teacher's feeling of loneliness that s/he has nobody to help him/her or has nobody to share his/her frustrating experiences with untraslatability issues (Nikolarea 2006b).
4. The ESP teacher's lack of knowledge of how to deal with untraslatability issues. In order for an ESP teacher to know how to deal with untraslatability issues, s/he should have a special training that combines Translation Studies, Terminology and Lexicography. Even if s/he has this training (as we have), it will take him/her some time (approximately 1-2 years) to become fully aware of inter-scientificity and develop his/her own tools to encounter it.

Therefore, keeping in mind both the complexity involved in inter-scientificity issues and the four psychological and cognitive interdependent factors that limit an ESP teacher to become aware of and deal with it, we propose that further research should be carried out as to whether the boundaries of ESP teaching in the 21st century should not only be redefined but also stretched. We would claim that ESP should stop being Anglo-centric (Bell 2006) and become broader in scope, bringing ESP teachers at English and non-English Universities, specialists of a variety of specific scientific domains, translation scholars and lexicographers together so that a wide range of specialists become aware of the semantic differences and nuances of the same terms in different disciplines – that is, the existence of inter-scientificity - and the interdependence of their disciplines and scientific discourses in an increasingly glocalised academic world. Thus, ESP teachers are encouraged to: (1) become better informed about terminological and discursive issues involved in their teaching; and (2) develop an network of ESP teachers and specialists (i.e. translators/interpreters, lexicographers, domain-specific specialists) who can exchange information and knowledge so that the former do not get frustrated when encountering difficult and perplexing terms and discursive behaviours and practices.

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